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AUTHOR	Hawkridge, David
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ABSTRACT

This paper examines two examples in Third World countries of new media being used for national development through education. The first example is the increase in television universities in China, i.e., universities that offer courses through broadcast educational television as well as videotaped recordings of television programs. Positive results in increased numbers of graduates and broadened curriculum are noted. Negative results reported include the choice of the particular brand of microcomputer to assist in the management of the television universities, and the plethora of television studios that now exist. Based on a study funded by the Harold Macmillan Trust, the second example is the increase in use of microcomputers in African, Asian, and Arabic-speaking nations. Reasons why developing nations with problems including poverty, rural lifestyles, lack of infrastructure, and disease, are spending national resources on the installation of computers in schools are suggested, and four rationales for educational improvement through technology--social, vocational, pedagogical, and catalytic--are discussed. (DB)

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THE ROLE OF NEW MEDIA IN THE KNOWLEDGE EXPLOSION

DAVID HAWKRIDGE

Institute of Educational Technology, The Open University, Milton Keynes

INTRODUCTION

In this paper I want to examine two important examples in the Third World of new media being used for national development through education. First, what of the Chinese television universities? Second, what of computers in Third World schools? From these two examples, I shall draw some general but provocative conclusions.

THE CHINESE TELEVISION UNIVERSITIES

The terrible events of June in Tiananmen Square-I cannot mention them without feeling deep anger towards those who suppressed the student movement-should not blind us to the remarkable achievement of the Chinese television universities over the last decade. Since 1982, I have been able to observe them personally, as Chairman of the International Advisory Panel for the Television Universities and Polytechnics Project. This project, funded jointly by the Chinese and the World Bank to the tune of about a quarter of a billion dollars, was aimed chiefly at modernising the 29 television universities' buildings and equipment, and at training their staff.

During the Cultural Revolution, from 1966 to 1976, there were no graduates from the Chinese universities. This was a disaster for the nation. To regain lost ground, the television universities started up in 1979 in all 28 provinces except Tibet. The Central Radio and Television University in Beijing began producing large numbers of recorded programmes. Today, broadcasts go out over a terrestrial channel and by satellite six hours a day, 9 a.m. to 3 p.m., six days a week, and there is a large stock of programmes on videocassettes circulating in each province. Most students watch the broadcasts in classes at their places of work, under the eye of tutors drawn from the same factory or office. Some attend similar classes at study centres under the supervision of local bureaus of higher education. Textbooks, similar to those used in the universities, are equally important as a teaching medium. Laboratory work is arranged in schools and colleges.

Unlike students of the Open University, the television universities' students are usually selected by their employers and must have obtained a certain mark in the examinations at the end of secondary school. To obtain a degree, at somewhat below the standard set by the OU, these students are released on basic pay for three years. Others take a few selected courses, without going as far as the degree. The curriculum, at first narrowly vocational and technical, is fairly broad but still looks very utilitarian. In recent years, as well as those who attend classes, many unregistered students--called free viewers--have sat and passed the examinations.

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During their short lives to date, these innovative institutions have had strong backing from the Chinese State Education Commission, and provincial education commissions have followed suit. But are the television universities successful, and, in particular, has the five-year World Bank project been a success? The final results are not yet in; the project evaluation has been suspended following suppression of the student movement.

On the positive side, the Bank loan prompted the provinces and municipalities to make additional investments in buildings and equipment. Most provinces exceeded their original targets. Before the loan money arrived in 1984, the television universities had already turned out the first batches of graduates, following a remarkably fast start-up which unfortunately almost overwhelmed their administrators. The new investment enabled them to move into proper buildings, recruit more staff and students, broaden the curriculum and so on. Most provinces now have new studios, enabling them to make their own programmes as well as receiving those from Beijing. Nine powerful new transmitters were installed in major cities such as Shenyang and Guuangzhou and are used to reach students up to 100 kilometres away.

On the positive side too are the huge numbers of graduates. Of the first intake of 110,000 students in 1979, 69% had graduated three years later. In 1987, for the first time in China, the State Education Commission organised follow-up students during which large samples of graduates and their employers were sent a questionnaire. The results reflect considerable satisfaction on the employers' part. Many graduates report using what they studied in their work and obtaining promotion.

On the negative side, I believe the most serious mistake was in ordering NEC minicomputers to assist in management of the television universities. In universities round the world, computers handle student applications, student records, staff records, financial transactions, planning data and so on. The State Education Commission was advised by experts at a Chinese key university to buy NEC 350 and 450 models. NEC cannot name any other university, anywhere, that uses them. Moreover, they can handle Chinese characters only slowly and with great difficulty. Ingenious as Chinese software specialists are, they have not yet cracked the problems associated with using these particular models, and an investment of about twenty million dollars is lying idle, a constant embarrassment to the authorities. Student records are being put onto microcomputers with the help of software such as dBase III, but this is no long-term solution.

Another mistake was to build so many studios. No other country has as many modern studios for educational television as China. Because education is largely "federalised" in China, provinces exercise considerable control, and some studios were built without proper justification, even out of local pride. Now, in bleaker times, there is no money to make programmes. Staff trained to use the equipment are doing other work. Only the richer provinces, and the Central Radio and Television University, can afford to make programmes regularly. Thus there is the paradox of too many studios and not enough new programmes. The stock of programmes is ageing, of course, just as the OU's does, and will have to be replaced eventually.

Despite these mistakes, I consider that the Chinese television universities must count as a successful use of new media for national development because they enable large numbers of people to obtain higher education in a country where it is desperately needed. These people would otherwise be excluded. The flaws in the television university system are there, of course, but so is its undoubted and continuing success.

COMPUTERS IN AFRICAN, ASIAN AND ARABIC-SPEAKING SCHOOLS

I turn now to my second example of new media being used for national development through education. Three months ago two colleagues and myself completed a study, funded by the Harold Macmillan Trust, of computers in African, Asian and Arabic-speaking schools. Of course, there are well-meaning people in industrial countries who ask whether Third World nations, let alone the schools, need computers. They point to the poverty, the rural way of life, the ample supply of labour, the lack of infrastructure, the crying basic needs for shelter, clean water and food. They do not believe that computers have a role to play in national development. That is not what Third World governments believe, though some of them feel under great pressure to "computerise". Some are having considerable difficulties, too.

Why do Third World countries want to put computers into their schools? The reason first offered is that children should be aware and unafraid of how computers work, because computers are pervading industrial societies and are likely to be important in all countries. Since schools prepare students for life, they should prepare them to deal with computers, which ought to be de-mystified. Many politicians feel that modernisation of schooling involves bringing in computers. If children need to become literate and numerate, today they need also to know something about computers. I call this the Social Rationale, because it deals with students' place in society. It leads Ministries of Education to provide classes or extra-mural clubs where children learn the principles on which computers work, including some elementary programming, but gain only a little hands-on experience. Usually they face no examination of their achievement.

A second reason offered is that children should learn to operate computers, at least at a basic level. Teaching them programming gives children some confidence in their ability to control computers, and possibly lays the foundation for a career in computer science. Teaching children how to use applications programs gives them skills that may be useful to them as students and when they move into jobs. At school, runs the reasoning, boys and girls should take courses in "computer literacy", "computer studies" or even "computer science", quite often aimed at preparing them for an examination. This is the Vocational Rationale: computer education should be related to future jobs, says the Minister of Planning.

A third reason advanced is that children will learn physics, art or any other subject better through computer-assisted learning. This is the Pedagogical Rationale, calling for improved teaching and learning, and may be the one that commands greatest support among educators. In this country, our Minister speaks Of computers-across-the-curriculum: not that computers should be used to teach everything in all subjects, but some topics in all subjects.

A fourth reason given is that schools can be changed for the better by the introduction of computers. Teaching, administrative and managerial efficiency may be improved. Some educators assert that when computers arrive in a school, its staff, parents and students are more open to change than they usually are.
Computers require students to do less memorizing of facts and more information-handling and problem-solving. Computers encourage students to learn by collaborating rather than competing with other students. Computers are seen as catalysts, enabling desired change in education to occur. This is the Catalytic Rationale, promising a somewhat Utopian future. It speaks of schools as they might become if only computers could be present in large enough numbers, with the right kind of software to enable students and teachers to change. Computers will help students to move away from rigid curricula, rote-learning and teacher-centered lessons, by giving more control to students of their own learning. "Let the child program the computer, not the computer program the child", shout some, and it is indeed a powerful idea. Students will no longer depend so much on teachers as experts. Thus poorer schools, with less well-qualified staff, will become better able to compete with elite schools. Somehow, say supporters of the Catalytic Rationale, teachers will adopt "more relevant curricula and bring educational opportunities to a larger number of children. Even administrators, through harnessing the computer, will change the way they manage schools-for the better, of course.

It would be a mistake to think that the Ministry of Education in any particular country will focus entirely on just one of these four, Social, Vocational, Pedagogical or Catalytic. Often two or three are advanced simultaneously to justify putting computers into schools. Nor are these four the only ones. There are at least two others, less commonly used.

The Information Technology Industry Rationale runs like this: in our country (it could be the United Kingdom or Zimbabwe) we want to build up a strong information technology industry. On the hardware side, we want to manufacture, or at least assemble, computers and their components. For this reason, the government should block imports of foreign machines, letting us develop and sell products suited to the local market. On the services and software side, we want to build up a highly skilled workforce of data-entry operators and programmers, capable of undertaking contract work for customers from this and other countries.

Proponents of this rationale tend to be from within the industry, and they favour placing large numbers of locally-made or assembled computers in the schools, at government expense, adding the comment that this will bring down the average cost of hardware and may indeed be the only way in which the national manufacturing enterprise can be viable, to the benefit of industry and commerce. The manufacturers and/or importers bring pressure to bear on Ministries of Education to prescribe the models they sell. Once the machines are in the schools, they expect the Vocational Rationale to prevail and have little interest in others. They have "made their market" once, and may be able to make it again if the country does indeed build up a workforce of programmers. This rationale is market-driven, without doubt, under the guise of serving national interest.

The Cost-Effectiveness Rationale commands little support, but its proponents argue that computer hardware and software can substantially replace teachers, and be more cost-effective. Some possibly draw their evidence from industrial and commercial training, where computers are cost-effective in certain settings. Others suggest that, in real terms, prices of computers are falling, whereas salaries of teachers are rising. They have little confidence in the abilities of teachers in developing countries, and believe that educational software from industrial countries can do the job as well, if not better than the teachers can. They ignore the socialising and other humanistic roles of schools, which parents take for granted and will not sacrifice. They dismiss the very high cost of developing and marketing culturally appropriate educational software, and the problem of obsolescence. They have no hard evidence to support their rationale, because no cost-effectiveness studies have been done.

National policy on putting computers into schools depends to a large extent on the dominant rationale. The Social Rationale does not lead to the same policy as the Vocational one. For example, if a government wants to teach computer awareness, it may put rather low-cost microcomputers into a large number of secondary schools. It will expect every school to have several teachers who, between them, can teach all students for 2-3 hours a week in, say, the second year. But if a government strongly influenced by the Vocational Rationale wants to introduce computer literacy or computer science, possibly as an examination subject near the end of secondary schooling, medium-priced microcomputers will be needed, teachers will have to be much better trained, and probably only selected classes of students will be able to take the course. In fact, the government will probably decide to limit hardware and software provision to a minority of secondary schools, on the grounds of shortage of resources and only a small national requirement for school graduates with computer science.

Governments influenced by the Pedagogical and Catalytic Rationales must face a far larger bill for hardware, software and training. The cost of developing and marketing suitable educational software is so high that very few countries have attempted it. The rest are importing software or doing without it. Those importing it are usually unhappy with what they get, for educational and cultural reasons. Those doing without it are escaping from these two rationales: they are giving up hope and may indeed be very sceptical of trials elsewhere.

Developing countries which are deciding that they need computers in their schools are also stating their reasons. Most of them place greatest emphasis on the Vocational Rationale, and much less on the Social, Pedagogical and Catalytic. For example, China, which committed about 50million in 1984 to support its policy on computers and expects them to proceed to computer science at university, or to be useful to their employers, because it perceives computers as an essential part of its drive towards modernisation. India, in launching its own massive project, wanted to de-mystify computers for as many students as possible, but also signalled its determination to give selected students a chance to enter this field. Pakistan, on a much smaller scale, is doing the same, in a pilot project aided by an international bank.

Tunisia's national project has ovowedly vocational goals and students will focus on learning programming and applications while gaining some knowledge of computer "architecture", that is, the design an inner workings of the machines they work on. Six Southeast Asian countries have planned a computer literacy course for all secondary students, with elective computer studies courses for upper secondary students, but they have hardly any programs to serve the Pedagogical Rationale and make no mention at all of the Catalytic one. Of the six, some have resources to implement the plan in full, others not. Mauritius and Sri Lanka are taking a similar Social and Vocational line, with undertones of the Information Technology Industry Rationale.

Other island nations, Fiji, Jamaica and Trinidad, found that their desire to follow the Pedagogical Rationale was frustrated because British origins of their curricula clashed with U.S. origins of the software, bought to run on U.S. machines. In Kenya, with the Ministry's blessing but not run by it, there has been a well-founded, but not entirely successful, attempt to follow the Pedagogical and Catalytic rationales as well as the Social and Vocational. Jordan and Egypt are setting out bravely under the Pedagogical Rationale.

These examples also frustrations. Ministries of Education without a policy on computers in schools are waking up to the fact that they need one, based on a clear rationale. The trouble is, the computers arrive anyway, whether through donations or by purchase out of non-government funds. This sort of pressure can be very damaging in developing countries. Without a policy computers arrive in uncoordinated fashion. Teachers are not trained. Software is scarce. Hardware is incompatible. Spares, repairs and maintenance hardly exist. Expensive private schools probably survive best, with a network of foreign contacts, quickly widening the gap between their students and the rest.

Ministries of Education with a policy, backed by a rationale or rationales, may still lack the resources to do all they want to, of course, and they may be unable to give computers high priority. But at least they are able to take important decisions, within the policy. For example, should they allow their schools to accept donations of hardware, particularly of obsolete hardware? Should they require schools to have at least one properly trained teacher before obtaining a computer? Should they set up a centre for support services and possibly to develop educational software? What degree of dependence on other countries can they tolerate?

The Social and Vocational Rationales are gathering strength in developing countries, with a few espousing the Pedagogical Rationale like their richer industrial neighbours. The Catalytic Rationale, noble as it is, remains in the background.

INTERNATIONAL COOPERATION AND AID

I will conclude by making a few provocative statements.

First, I am absolutely certain that achievement of important national development goals is at stake in both cases. Education is a key factor.

Second, these goals cannot be achieved without using new media in education.

The Chinese television university example is the more dramatic of the two perhaps, but governments of Third World countries spending millions of scarce foreign exchange on computer education are not doing so lightly.

Third, it is clear that international cooperation and aid was and is necessary where the new media are being used. The Chinese television universities might well have collapsed without the World Bank loan; with the loan, they have been able to obtain foreign equipment and technical assistance. Third World countries cannot get started on computer education without foreign hardware and software, and they will not be able to continue without further international help.

Fourth, the industrial countries are not doing very well in providing this international cooperation and aid. In my opinion, Japan is as much to blame as China for those unsuitable computers in the television universities. The U.K. must take some of the blame for early problems as well as credit for successes in the Indian computer education project. The U.S. has pushed its hardware into countries where it is inappropriate for education. France has fought with the U.K. to gain a foothold in schools of countries where it is inappropriate for education. France has fought with the U.K. to gain a foothold in schools of countries such as Egypt and Mauritius. Italy is supplying to Tunisia hardware that can only serve the Vocational and IT Industry Rationales. In the fierce heat of the computer marketplace, ill-advised and ill-informed Ministry officials can make costly mistakes.

Fifth, there's more to come! Five years ago, educational television had come to the Third World--and gone again from most of it. Computers were only on the horizon. Now they have landed in large numbers, and the invasion is in full swing. They will not go away. In the 1990s, computers will increase their contribution to national development through education.

Industrial countries need to improve their provision of aid. Developing countries need to formulate policy. All countries need to know more about how to exploit new media in education, to their mutual advantage.

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